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Memoirs of the Geological Survey of the United Kingdom. The Silurian Rocks of Britain. Vol. I, Scotland, 1899. By B. N. PEACH, JOHN HORNE, and J. J. H. TEALL.

This publication, which comprises the first volume of a proposed monograph on the Silurian rocks of Great Britain and Ireland, treats of the Silurian formations of Scotland in a praiseworthy degree of completeness. It is a work destined to maintain the high standard of excellence attained by the British Survey Reports.

The opening chapter is devoted to the physical features of the Silurian region. The region in general comprises the Southern Uplands which, lying between the Central Lowlands on the north and the Cheviot Hills and Solway Firth on the south, stretch from the North Sea to the Irish Channel. The topography of the region varies from the uniformly smooth or undulating types in the central and eastern parts to the rugged craggy type of the southwestern part. The Uplands vary in height from one to two thousand feet. The northern border is traversed by an extensive fault which lets down the Devonian and Carboniferous rocks of the north to form the surface of the Central Lowlands.

The succeeding chapter is devoted to the history of previous researches among the rocks of this district. These researches cover a period of more than a century, and have engaged the attention of many of Britain's foremost geologists of the past and present. Beginning with Hutton among others are the names of Hall, Fairplay, Nicol, Harkness, Murchison, Sedgwick, Ramsay, A. Geikie, J. Geikie, and Lapworth, besides the names of the authors, Peach, Horne, and Teall. To Lapworth is given the credit of establishing by paleontological and stratigraphical achievements the true order of succession of the Silurian strata. His studies of the sequence of the Silurian graptolite faunas made possible the correction of erroneous estimates of the thickness of the beds and enabled the structure of the region to be worked out in the most complicated areas.

The stratigraphy and the tectonic arrangement of the rocks are set forth in the third chapter of the volume. The Lower Silurian series is divided into the Arenig, the Llandeilo, and the Carodoc formations. The Arenig strata consist of cherts, mudstones, shales, and volcanic tuffs interbedded in places with tuffs, lavas, and agglomerates, associated with intrusive masses comprising serpentine, olivine, enstatite rock, and gabbros. Many of the volcanic eruptions took place under submarine conditions. There were also periods of quiescence, during which fine sands and mud containing fossils were deposited.

A subsidence of the sea floor ushered in the next period, the Llandeilo. The rocks of this formation are radiolarian cherts and mudstones which were deposited in clearer waters than the rocks of the Arenig. The rocks of the Carodoc are shales, conglomerates, and limestones, implying variable conditions of deposition.

The Upper Silurian, it is said, is separated from the Lower Silurian by both physical and paleontological changes. But there appears to be no great paleontological break such as characterizes the separation of the Ordovician from the Silurian on the interior of the American continent. The transition from the Lower Silurian to the Upper Silurian types is a gradual one. This province may constitute one of harbors of refuge spoken of by Professor Chamberlin in his discussion of the source of provincial faunas. It would correspond, then. on the American continent, to the embayment at the mouth of the St. Lawrence. The following table will serve to compare the distribution of the Brachiopods common to the two countries, Scotland and America:

	Scotland		America	
	Lower Silurian	Upper Silurian	Ordovician	Silurian
Atrypa reticularis	x	x	..	x
Atrypa marginalis	x	..	..	x
Cyrtia exporrecta	..	x	..	x
Leptaena rhomboidalis	x	x	x	x
Plectambonites transversalis	x	x	..	x
Platystrophia biforata	x	x	x	x
Rafesinesquina alternata	x	..	x	..
Bilobites bilobus	x	x	..	x
Dalmanella elegantula	x	x	..	x
Dalmanella testudinaria	x	..	x	..
Orthis tricenaria	x	..	x	..
Pentamerus oblongus	..	x	..	x
Uncinulus stricklandi	x	..	..	x
Spirifer crispus	x	x	..	x
Spirifer radiatus	..	x	..	x
Rafesinesquina deltoidea	x	x	x	..
Rafesinesquina imbrex	x	..	x	..
Total of species	14	11	7	12

This table shows that of the fourteen species occurring in the Lower Silurian of Scotland but one half that number are represented in the American Ordovician, the other seven species appearing in the American Silurian. As most of these species occur in the last member of the Lower Silurian, the Carodoc, it is probable that this formation forms the transition zone between the Ordovician, as we know it, and the Silurian.

The Upper Silurian series is divided into the Llandovery, the Tarannon, the Wenlock, the Ludlow, and the Downtonian. These formations consist of mudstones, limestones, grits, graywackes, and conglomerates. The Downtonian which hitherto has not been recognized as a part of the Silurian is probably the equivalent of the Waterlime formation of our own country. It contains a fauna consisting of Ostracoids, Eurypterids, and fishes similar to the fauna of the Waterlime formation. This formation immediately underlies the Old Red Sandstone.

The economic products of the Silurian formations are lead, iron, copper, antimony, manganese, zinc, mispickel, silver, and gold, besides building materials, road-metal, and hone-stones.

Other chapters in the book are devoted to contact-metamorphism, and to the granites and associated igneous rocks.

W. N. LOGAN.

Genesis of Worlds. By J. H. HOBART BENNETT. Springfield, Ill.: H. W. Rokker, printer, 1900. Pp. 345.

This work does not need serious review from the point of view of science. It is the product of a mind deeply interested in the problems of cosmogony and apparently ready to accept the demonstrations of science, but yet still under the dominance of the traditional anthrophic mode of thought. It betrays throughout a serious lack of firm grounding in the elements of the sciences involved in the subjects under discussion, a grounding absolutely necessary to their successful treatment. The mode and style of the book may be illustrated by the following quotation from page 3:

> Inquiring minds have a propensity for tracing things to a first cause, and would ask from whence came the great nebula. It could not have sprung into existence already formed. It had an origin which is worthy of a most careful investigation, for it is one of a class that is represented by thousands